Exhibit 2

Schalk Transcript Excerpts

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

SCANSOFT, INC.,	)	
Plaintiff,	)	
v.	)	C.A. No. 04-10353-PBS
VOICE SIGNAL TECHNOLOGIES, INC., LAURENCE S. GILLICK, ROBERT S. ROTH, JONATHAN P. YAMRON, and MANFRED G. GRABHERR,	)	
Defendants.	)	

DEPOSITION OF THOMAS B. SCHALK, a witness called by and on behalf of the Defendants, taken pursuant to the applicable provisions of the Federal Rules of Civil Procedure, before Dana Ulrich Welch, CSR, Registered Professional Reporter, and Notary Public, in and for the Commonwealth of Massachusetts, at the offices of Choate, Hall & Stewart, 53 State Street, Boston, Massachusetts, on January 28, 2005, commencing at 9:18 a.m.

Job No.: 2197

ORIGINAL

APPEARANCES:

For the Defendants:

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By: Robert S. Frank Jr., Esq.

For the Plaintiff:

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And: Jack C. Schecter, Esq.

Also Present: Daniel Roth

I N D E X

E X H I B I T S

P R O C E E D I N G S

(The Texas driver's license number as identification of the deponent was noted for the record.)

WHEREUPON,

THOMAS B. SCHALK,

having duly sworn or affirmed that his testimony would be the truth, the whole truth, and nothing but the truth, testified as follows:

MR. FRANK: I'm not quite sure what the previous arrangement has been, but we're prepared to stipulate that, although Mr. Schalk should read and sign the deposition, that it need not be -- his signature need not be notarized.

And the only other agreement that I'd ask is if there are no corrections after 30 days, that the deposition be deemed to have been signed in its then current form. Is that acceptable?

MR. SCHECTER: That's acceptable.

DIRECT EXAMINATION

BY MR. FRANK:

Q. How long did you work for Wirenix? What was your position with Wirenix?

A. CTO.

Q. How long did you work for Wirenix?

A. That's a difficult question to answer, because we were trying to raise money and I ended up sort of giving up on that, and I did some consulting. So we'll say approximately six months.

Q. Okay. And what was your next employment after Wirenix?

A. I did some formal consulting work for NetByTel. But my first full time job was ATX.

Q. When did you start at ATX?

A. September 1st of 2002.

Q. If I understood you correctly, you said that after you left Philips, you consulted to Philips --

A. Yeah, that might have been -- it was sometime between the time I left Philips and the time I joined ATX. I don't remember exactly when. But I did some brief consulting.

Q. What was the subject matter of that consulting?

A. It was patent.
Q. Do you recall which patents?
A. They were related to voice activated dialing; but I don't remember exactly which ones.
Q. Have you -- do you have or have you had an employment or consulting arrangement or relationship with ScanSoft?
A. Can you restate the question?
Q. Sure. Actually, I asked you two questions. I'll break it into two parts. Do you presently have a consulting arrangement with ScanSoft?
A. I have a consulting arrangement with the attorneys representing the ScanSoft patent case.
Q. So let me see if I understand. You've been -- have you been retained as a consultant by Bromberg & Sunstein, the law firm?
A. I'm not certain of what your definition of retained is.
Q. Do you have a consulting agreement with Bromberg & Sunstein?
A. I have a verbal agreement.

Q. I take it that agreement is not recorded in any writing?

A. They may have faxed me something. I don't remember the exact arrangement. I agreed to act as a consultant over the telephone.

Q. Okay. And apart from testifying here and preparing for that testimony, have you provided other consulting services?

A. Prior to yesterday?

Q. Prior to yesterday, yes.

A. Yes.

Q. Okay. And would you describe the general nature of those consulting services?

MR. SCHECTER: I'm going to object to that. To the extent you can do so without revealing any attorney work product, feel free to answer.

THE DEPONENT: I would call it general support, requests for information.

BY MR. FRANK:

Q. Okay. And are you paid for those consulting services on an hourly basis?

A. Yes.

Q. What's the hourly rate?

of those applications is telephone -- is cellular telephones. Do you see that?

A. Yes.

Q. Okay. And then below that it says, "There are 25 companies in the U.S. presently working on the technology." And I don't suggest that that's limited in that context to cellular telephones. Who were the others working on voice recognition technology as it relates to cellular phones at that time?

A. At that time, I honestly don't remember.

Q. Who else was working on voice recognition technology in connection with voice dialing at that time?

A. I honestly don't know. We may have been the only ones at that time.

Q. Okay. Now, let me show you something else.

MR. FRANK: Please mark as Schalk Deposition Exhibit 2 for identification a document which appears to be an article from a publication called "Speech Technology," September/October 1986. And

ask you, sir, to take a moment, familiarize yourself with the document while the reporter marks this and then I'll ask you some questions.

(Schalk Exhibit No. 2 marked for identification.)

BY MR. FRANK:

Q. Do you recognize Exhibit 2, sir?

A. I remember it. I can't say I remembered it before I saw it again. But yes, I do remember this.

Q. When did you see it again?

A. When -- I believe the time that I've seen it within the last year was in some documentation associated with a subpoena from ART. I believe it was an attachment.

Q. I take it that -- well, first, what is Schalk Exhibit 2?

A. It's an article.

Q. Okay. Prepared by you?

A. That would be what one would conclude, yes.

Q. And was that article published in something called "Speech Technology"?

A. Yes.
Q. What is "Speech Technology"?
A. In the context of a publication?
Q. Yeah.
A. I believe it was a magazine, a marketing magazine.
Q. Dose it still -- is it still a publication or has it ceased to publish?
A. This particular one ceased to publish. But there's one today that's called something very similar.
Q. Did this publication appear in the September/October 1986 issue of "Speech Technology"?
A. I don't remember. But that's what one would conclude if you look at this.
Q. You don't have any reason to think that that's wrong?
A. I have no reason to think that A, this didn't exist or it's been doctored or anything.
Q. Do you recall how long prior to the actual publication you wrote this article?
A. My guess is that it was literally days before it went to press because of the nature

of -- the way you do things for publication like this.

Q. Okay. And did it -- let me direct your attention first to the left-hand column on the first page of the article. Toward the bottom of the column it says that, "A speaker-independent voice recognition system for cellular phones has been developed." Do you see that?

A. Uh-huh.

Q. I take it that statement was correct as of the date of the article?

A. Yes.

Q. Okay. And it goes on to say that, "This Voice Control unit is designed to operate optimally in driving vehicles." Do you see that?

A. Uh-huh.

Q. That was correct, as well?

A. I assume so. I mean --

Q. So do I. Would you -- the system that is described in Schalk Exhibit 2, was that shown or displayed at any trade show or other industry gathering at about the time that

Exhibit 2 was published?

A. I don't remember exactly when, but it would be -- I would -- I would -- I believe that we did show it at trade -- we showed something. I remember that it was very difficult to do that because of the environment.

Q. When you say it was difficult, what was it difficult to do?

A. To demonstrate voice recognition at all in any kind of environment where there were a lot of people talking and such, which is what happens at trade shows and things like that.

Q. Did you attend trade shows in 1986 at which you, you, Voice Control, displayed the thing that is described in Schalk Exhibit 2?

A. I don't remember, but it's very possible. I don't remember specifically.

Q. All right. Now, this refers to the system that you had developed as being speaker-independent.

A. Yes.

Q. What does that mean?

A. Speaker-independent means that the

system is designed to understand spoken input in a particular language, regardless of the individual producing the speech.

Q. At least at that time, was speaker-independent voice recognition distinguished from speaker-dependent voice recognition?

A. Yes.

Q. What was speaker-dependent voice recognition?

A. Speaker-dependent recognition was a type of technology where you would first define the vocabulary items. And then a particular targeted user would speak the items or the vocabulary words. And the system would learn templates that represented each of the vocabulary words for the individual who was planning to use it at a subsequent time.

Q. And did speaker-dependent voice recognition also allow the speaker to select the words that could be recognized?

A. In theory, yes.

Q. Okay. Turning to the second page of the article, in the center column toward the

bottom, it says that "The cellular phone recognition system described here was designed to work under close talk conditions with a cellular handset." First, tell me what -- what is meant by the phrase "close talk conditions with a cellular handset"?

A. That means that the microphone element contained within the cellular phone handset was held close to the mouth, much like a conventional telephone.

Q. Okay. And is the distinction between what you've just described on the one hand and the microphone being located some distance from the driver, for example, on the visor of the car?

A. That's correct.

Q. When the microphone is on the visor of the car, that was called far talk?

A. That's what we called it.

Q. Okay. And is it correct that the system recognized a defined vocabulary?

A. Yes.

Q. Turning if you would to page number 26, at the top, am I correct in understanding that

the commands that it recognized were the 28 listed things that appear in the right-hand column?

A. As subsets, but not as one set.

Q. Okay. Let me ask you to explain what you mean when you say, "as subsets but not as one set"?

A. For example, if you pushed -- if you started the system, it wouldn't be listening for all these words. It would be listening for maybe "dial" or "call." So you would have sub-vocabularies that would activate subsequent application specific vocabularies.

Q. Okay. The article refers -- let me get you to stay with that for just a moment.

A. Okay.

Q. The article refers on page 27, center column, top, to something that is referred to there as "syntactically structured voice commands from the user and voice responses from the voice control unit." Do you see that?

A. Where?

Q. Very top.

A. Oh, very top. Yes, that's --

Q. So let me just make sure that I understand. As this product was designed, it listened first for a command that would tell it what type of command to listen for next; have I said that accurately?

A. Well --

MR. SCHECTER: Objection.

BY MR. FRANK:

Q. Please answer.

A. First, we're not talking about a product here.

Q. The thing.

A. The thing or the system, the prototype is probably the most accurate word, would listen for a particular set of words. And then based on what was recognized, it would listen for potentially a different subset of words. And I think that's what's being articulated in the article.

Q. The words that it listens for are referred to in the article as commands; is that an accurate description? Or let me frame it this way: Is that a description that people used at the time to describe the verbal

utterances that --

A. Loosely, yeah, loosely. Commands, you know, people think of voice commands in a general sense. But then there are command and control words versus other types of words. I wouldn't call "four" a command word, unless it was used to indicate a choice, like I want to call four or something.

Q. Let's just take it one step at a time. You've told me that the system could recognize the words that are listed on page 26. And those -- the words that the system recognized -- actually, let me return to the top of page 27. And I want to lead you back to the language which is in the center paragraph on page 27.

In the same paragraph that I directed you to, after saying that "The unit centers around syntactically structured voice commands from the user," it refers to voice responses from the voice control unit. Do you see that?

A. Uh-huh.

Q. Okay. It then says that "The command syntax structure is illustrated in Figure 3."

Do you see that?

A. Yeah. From high, low, yeah.

Q. And does Figure 3, in fact, set forth the command structure for the cellular telephone recognizer that's described in the article?

A. From a high level, yes.

Q. And is it correct that you would -- that the first type of command that the system would listen for was the word "dial" or the word "recall" or the word "speed dial"?

A. That's what's implied by the diagram. I don't remember what exactly we had active because --

Q. Do you have any reason to think that the article was an inaccurate description of the then existing thing?

A. It could be misleading, because a lot of the details of the actual system were filtered out. So if one were to take this and say that's all you need, it would be misleading in that context. But to teach someone the concepts, this is accurate.

Q. So the system listened for either the

command "dial," the command "recall" or the command "speed dial"; is that correct?

A. Yes. Something like "clear" might have been used to turn it off.

Q. So there were yet other commands?

A. There could have been. I don't recall. It wouldn't surprise me if there weren't.

Q. Okay. Now, if the system heard the command "speed dial," for example, is it correct that it recognized that it should listen for a particular type of word or command to come next, as distinguished from the entire universe of words or commands that it might be listening for?

A. I'm not sure if -- I'm not sure what your question is.

Q. Why did you -- why was this hierarchical structure created?

A. Well, it represents the application flow. But in general, you want to minimize the vocabulary complexity at any time because of accuracy limitations.

Q. Let me see if I understand. When a speaker makes sounds, is it correct that in the

technology that existed then, and that's described generally in this article, the system compares those sounds to recorded templates and establishes a probability as to what it is most likely that the speaker just said?

A. That's one way to think of it; that's not how the technology worked, though.

Q. Would you explain how the technology worked?

A. That's a very involved question.

MR. SCHECTER: I also want to say if we're going to go into that level of specificity, as to how the technology worked, I'm going to have to ask Mr. Roth to absent himself.

MR. FRANK: We're talking about 1985 technology.

BY MR. FRANK:

Q. Is it correct that, in general, the objective of the system was to --

A. To classify.

Q. What do you mean by classify?

A. You would speak something. It would analyze it, it being the speech recognizer.

And it would produce a match with one of the words that were active or a reject, meaning that it couldn't figure it out very well.

Q. And is the process of matching made easier if the system is only attempting to match against a subset of the entire vocabulary that it might hear?

A. Well, the smaller -- people can say anything at any time, and so you're trying to constrain what a user speaks. And you want what the user speaks to be represented in the vocabulary. So if you're dialing a phone number, you don't go, "6, 5, yesterday, house, 2, 3."

Q. Yes.

A. So the recognizer is not going to listen to "house, yesterday," and so forth. It's going to listen for words or utterances that correspond to dialing commands or utterances or digits.

Q. Okay. So let me see if I can simply illustrate what you said from this article. If the voice recognizer hears the word "speed dial" --

A. Yes.

Q. -- it --

A. If it recognizes the word "speed dial."

Q. A person utters a group of sounds which in auditory speech you and I would understand to be the words "speed dial." The system then asks itself, what did I just hear. And it, by some process, determines that it just heard the words, the command "speed dial"?

A. Yes, conceptually correct.

Q. And the system is now cued to expect a follow-on command, which is within -- which is a subset of the total potential vocabulary?

A. Vocabulary, yes.

Q. And the follow-on command might be the word "home" or "office" or a set of utterances which the system interprets as the word "home" or "office"; is that correct?

A. It's listening for a set of vocabulary items. You say something and that activates a new set of vocabulary items. And depending on the application, what gets recognized after that, if anything, you might get a different set; that's what's illustrated in this diagram.

Q. So for example, if "speed dial" is one example, and the subset of the vocabulary that the system is then listening for is in the box that's under the word "speed dial"; is that correct?

A. Yes.

Q. And if the system hears the command "dial" and then it listens for the commands which are in the box underneath the word "dial"?

A. Yes.

Q. And similarly, if the system hears the word "recall," it then listens for the commands which are in the box under the heading "recall"?

A. Yes.

Q. Okay. If the system hears the commands in the box under "recall" or the commands in the box under "speed dial," it then performed a second step, which is to do some kind of a look up to associate a prerecorded telephone number with whatever either two digit memory code or word it believed it heard; is that correct?

A. There were, as I recall, there were

phone numbers associated with the two digit memories codes or the speed dial words, "spouse," "home," et cetera.

Q. So taking just the example of "home" as the example. If the system heard the command "home," it would associate that in some fashion with a telephone number, which I assume was in some form of look up table; is that correct?

A. Yes. It was programed somehow in the memory.

Q. And having retrieved that telephone number, it would pass that telephone number along to a dialing --

A. Process.

Q. -- process; is that correct?

A. That would be how I would assume, yes.

Q. Okay. Now, if the system heard the command "dial" and then a series of digit commands, am I correct that it deciphered or attempted to recognize each digit separately?

A. It was one at a time. There were control words. There were other words besides digits. But yes.

Q. Okay. And once the system had obtained

a string of digits corresponding to a phone number, it would then pass that string of digits along to a dialing functionality?

A. The system would capture -- that's not exactly correct because people could speak anything with this system and you had a command to terminate the spoken digit sequence to indicate that that's the equivalent to what someone dialed on the phone.

Q. Okay. So let me see if I understand. Step number one would be to say the command "dial"?

A. Yes.

Q. That would cause the system to start listening for digits; is that right?

A. Yes, with this implementation, yes.

Q. And then the next step would be or the next command would be a string of digits, followed by a word or command that the system recognized as demarking the end of the string of digits?

A. Yeah. It would be like pushing a send button on a cell phone, you know, where you dial and you're saying okay, that's what I want

the call, other than you could push the button. And we may have had or -- well, you could say "good-bye" or "end." The hard part was activating it.

Q. So turn, if you would, to page two. Am I correct in understanding that in the Uniden product -- well, first, am I correct in understanding that the Uniden product described in Exhibit 4 was developed by Voice Control Systems?

A. The technology used in this embodiment was our technology.

Q. Was the physical thing manufactured by Uniden or for Uniden?

A. I believe it was manufactured for Uniden. I don't know who manufactured it.

Q. And I take it that thing was sold by Uniden to people, to people who wanted to use it in connection with the use of a mobile phone?

MR. SCHECTER: Objection.

THE DEPONENT: Like a lot of these, they did not become actual products you could buy off the shelf. I think this one

did, but I don't remember. None of them were pervasive.

BY MR. FRANK:

Q. I know. But there were some units sold by Uniden, correct?

A. I don't remember for a fact. I think so, but I don't remember for a fact. It wasn't millions of them. It wasn't anything that made our company, you know --

Q. Rich?

A. -- remember it.

Q. Well, certainly, it was something that Uniden tried to sell to people, correct?

A. Bob Charles certainly did. His job was to get them to sell it. And it seemed like some progress was made, but I don't remember how successful.

Q. And Uniden did offer to sell this product for a defined price to people, correct?

A. I don't remember for certain whether this became an off-the-shelf product.

Q. Do you have any reason to believe that it didn't?

A. I have no reason to believe that it

didn't.

MR. FRANK: Let me show you a different document which I'll ask the court reporter to mark as Schalk Exhibit 5 for identification. And before I ask you about it, I need to provide a little background about the document.

MR. SCHECTER: I just want to object. This is marked highly confidential, subject to protective order.

MR. FRANK: Yes. Is it your suggestion that I can't use a document produced in this case with a witness in this case?

MR. SCHECTER: I'm sorry. I was confused as to who produced this. This is a TI document, correct?

MR. FRANK: That's correct.

MR. SCHECTER: I don't believe that Dr. Schalk would be privileged to look at confidential documents of TI. Maybe I'm wrong and you can talk to TI about that. I'm unaware of that part.

MR. FRANK: I'll withdraw it.

BY MR. FRANK:

Q. Let me ask you, sir, let me ask you whether the following statement is correct -- well, first, did Voice Control approach TI in or about 1990, with respect to the purchase or the potential purchase of components from Texas Instruments?

A. It's very possible.

Q. Okay. And is it correct that at that time the production volumes of the -- of the hands-free dialing product of the type described in the Uniden materials in Exhibit 4 were on the order of 20 to 25,000 units a year?

A. I have -- I don't have any reason to believe that's true or false.

MR. SCHECTER: Just so I can be clear, that was not marked as Exhibit 5, right.

MR. FRANK: No. I'll withdraw it.

BY MR. FRANK:

Q. Now, the way the Uniden product worked, and I direct your attention now to page two, was that, in effect, the product was alerted to start listening for further commands by the command "phone start"?

A. Yeah. After you turn it on, and as it

indicates, you'd say "hello," it would be listening for "phone start," "activate service," some kind of pair of commands.

Q. And there was to be a pause between the word "phone" and "start"?

A. Had to be.

Q. Of a sufficient duration?

A. Had to be, yes.

Q. Okay. And if the speaker spoke too rapidly, the system would say back to you "slower, please," that is, it would prompt you to put a longer pause in the middle?

A. Not during the activation phase. I believe it would just sit there unless it heard something that met all the criteria; in other words, it would stay dormant.

Q. Let me direct your attention, if I could, to the second page. You see the heading that starts with the word "note"?

A. Uh-huh.

Q. Now, let me direct your attention to the paragraph that's just underneath it. It says, "If too short a pause is left between the words" and I think the words that are being

referred to there are "phone" "start," "voice dial may remain silent while waiting for the second word, say 'slower please,' which indicates that not a long enough pause between the words, that there was not a long enough pause between the two words."

A. Yeah, that's obviously what is written here. I wouldn't have thought we did it this way, but it's very possible. It's certainly a possible way that it was implemented. We had a lot of issues with this particular feature.

Q. Is it correct that when the system was ready to receive further commands, it spoke the response "ready"?

A. Yes.

Q. Okay. And was that response prerecorded or synthesized?

A. I'm pretty sure it was prerecorded.

Q. And one set of options were that the user could then issue the command "dial"?

A. That would be very, very likely, yes, because we had "dial," "call"; we had a couple of times we switched those around, but dial was probably the one.

Q. And the Uniden product would then prompt the user to issue a command consisting of a string of digits by saying "number, please"; is that correct? Top of page four.

A. According to this document, that's how it works. I don't remember exactly what it said. We had a number of ways to prompt for digit sequences.

Q. Was that a way?

A. I have no reason to believe that this was not how it worked.

Q. Am I correct that if this functionality was being used, the user would then speak a string of digits one at a time?

A. Yeah. Yes.

Q. And just as you explained before, after speaking the last digit, the speaker would say "end," signaling to the voice recognizer the string of digits had been completed?

A. That was the anchor command, if you will.

Q. Then is it correct that the product designed by Voice Control would repeat the digits that it had heard back to the user in

some fashion?

A. Yes. I believe that's true.

Q. And if the user were satisfied, he would then say a word like "send" --

A. Or "dial."

Q. -- or "dial"?

A. Yes.

Q. Which, if recognized accurately by the device, would cause the telephone number that is the same as that string -- as the spoken string of digits --

A. Yeah. It would feed the string of digits that was recognized into the phone as though you were typing them.

Q. Okay. And if it didn't understand a digit, it would say "repeat, please" or something like that?

A. Yeah. "Please repeat." There were various implementations; sometimes it would say "pardon." When it didn't classify something, it would usually tell you to repeat it.

Q. And is it correct that there were a set of commands that would or there was a command that would alert the voice recognizer that the

next command coming was a word like "home" or "office"?

A. Yeah. Something like "call" instead of "dial."

Q. So let's see --

A. I don't remember if that's in there. But it would have been something like that. We used to use "speed dial"; that didn't work very well. We switched over to other words. Yeah, "call."

Q. Where are you, please, what page?

A. Page five.

Q. Yeah. So --

A. This is for redialing, but --

Q. Well, go to page ten, if you would.

A. This is --

Q. One of the functionalities of the system -- and I'm directing you to page ten. I will come back to that.

A. Sorry.

Q. The user would begin the exchange by saying "phone" and then the word "start."

A. Right.

Q. And if that were recognized, the device

would say back, "ready"; is that correct?
A. Yes.
Q. The user would then say "call"?
A. Could say "call."
Q. Okay. And assuming that the word "call" were recognized as the word "call" by the voice recognizer, it would then listen for one of the predefined command words, "home," "office," "secretary," and so on?
A. Yes.
Q. And did the system then say -- let's assume that the speaker said the word "home," would the device then repeat back to the speaker the verification "calling home"?
A. As I recall, yes.
Q. And if the speaker was satisfied that that's what he had, in fact, said, he would say "send," and assuming that the word send was properly recognized, the system would do two things; first it would do a look up to determine what telephone number was associated with the command word "home"?
A. Yes.
Q. And having identified that telephone

number, it would send that telephone number to a dialer?

A. Yeah. In some fashion it would simulate or somehow communicate to do the same thing as dialing the number, the stored number.

Q. Okay. And is it correct that substantially the same process would be followed if the user wanted to enter a speed dial that was a number rather than the command "home" or "office"?

A. You could speed dial with a numeric indicator, yes.

Q. Now, let me direct your attention to the chart that's on page 12. Is it -- does the chart on page 12 accurately set forth the command structure that was used in the Uniden product?

A. That's -- yeah, I would assume that. I have no reason to believe anything in this is intended to be wrong. So yes.

Q. So that in each case, there was what I describe as a first stage command that would -- that if recognized, would alert the voice recognizer to listen for a subset of the

Uniden product?

A. I can -- I remember which chips we used. There was a family of 8186; there was also a TMS 320, a digital signaler processor series. I believe one's an Intel and one's a Texas Instruments kind of processor. Exactly what we used, I don't remember.

Q. Is there an Intel chip that you associate with chips that had become powerful enough and small enough so that you could have a speaker-dependent and speaker-independent functionality in the same product?

A. Without putting a timeline on it, yes.

Q. What Intel product do you associate with that greater -- that smaller footprint and greater capability?

A. Smaller footprint is not what I meant.

Q. I'm sorry.

A. It could accommodate more complexity and more memory, but you know, without increasing in size or cost. So I don't know exactly. There was more than just the processor. There was memory. And then there was the audio interface, the analog to digital

and digital to audio component of cost.

Q. Do you associate a particular -- well, first, let's take the CPU chip; was it a 286 chip that permitted --

A. I don't remember which one it was. I'm not a hardware expert. I'm a signal processing expert. So that would have been, you know, we had people that specialized in that, Bern Bareis being one, Larry Morse being one and Steve Peterson.

Q. Did Voice Control Systems develop -- did there come a time when Voice Control Systems began work on a product where the voice recognizer would be located someplace else than at the handset?

A. Yes.

Q. Okay. Where was the voice recognizer to be located as associated with that product?

A. Of course, there was the cellular switch-based recognizer, which I would refer to as off-board.

Q. Okay. What's the easier -- the cellular switch-based product is something you called an off-board product?

A. Yes.
Q. As compared to an on-board product?
A. Embedded. Embedded is the word.
Q. I just want to get the nomenclature straight, so we're talking about the same thing. One type of product is a so-called embedded product and that's a product that's embedded in a cellular handset?
A. Not necessarily in a handset; but it's part of the phone.
Q. Part of the cellular telephone?
A. And a good way to think of it is that for an embedded solution, you have a direct connection between what you speak into and the recognizer; whereas with an off-board, you're going through some wireless media to communicate the audio in both directions.
Q. Okay. I think I understand. Let me just say it back to you to make sure I do have it. With the embedded product, that product was either part of the cellular handset itself or at least it was so closely associated with the handset that you were speaking directly to the voice recognizer and not over the air

waves?

A. Yes. But let me clarify. In the time frames we've been talking where the portable phone, where the handset was it, was still --

Q. Large?

A. Well --

Q. Larger?

A. Well, it hadn't really come to fruition. I don't remember the exact time. But portable phones -- what existed back when we were working on these were separate transceivers. So you would pick up the phone and a lot of the intelligence, including the transceiver, would be not in your hand. You would not have the antenna up there; you'd have it in the back of your car.

Q. My memory is that those were the first car phones, what lay people, those of us in the lay public refer to as car phones.

A. When people think of car phones, those are the ones they think of. There was actually something before that, but --

Q. That was, in fact, transmitting messages over a cellular system; is that

correct?

A. Yeah, audio. They were audio channels and bi-directional audio, yes.

Q. And you distinguish that -- that's what you've been calling or what I think you called an on-board system. Whereas an off-board system is a system that was typically either a part of or peripheral to a central switch; is that correct?

A. That it's relying on wireless media or some kind of connection. A telephone could be -- a land line telephone could also be an off-board kind of thing. When you call into a call center and you get a computer, that would be certainly not in the handset; it would be off-board.

Q. It's essentially, that, too, is associated in some way with a centralized location; is that correct?

A. Yes.

Q. So instead of there being a voice recognizer in or associated with each handset on the periphery of the system, the voice recognizer, a single voice recognizer or at